Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C., 20555-0001
Attn: Rulemakings and Adjudications Staff

September 2, 2002

Petition

1 Brief description of needed regulations.

Regulations are needed to address the impact of fouling on the performance of heat transfer surfaces throughout licensed nuclear power plants. This includes all heat transfer surfaces; fuel elements, steam generators, condensers, fan coolers, etc. The new regulations must also require the inclusion of fouling considerations in NRC funded test programs such as the Rod Bundle Heat Transfer (RBHT) at Penn State. Furthermore, fouling considerations must be added to the vast assortment of NRC produced computer codes such as the RELAP and TRAC series.

2. Petitioner's grounds for and interest in the action requested.

Petitioner is aware that the fouling of heat transfer surfaces is generally not adequately considered in the licensing and the compliance inspections of nuclear power plants.

3. Petitioner's statement of the specific issues involved; views with respect to those issues, relevant technical, scientific, or other data involved:

The following examples cover only a few of the significant heat transfer surfaces within operating nuclear power plants. The NRC must produce a complete inventory of all significant heat transfer surfaces. The regulations must require appropriate reporting of the performance of these surfaces including records of degradation, cleaning procedures and effectiveness, mechanical degradation of the heat transfer assemblies especially the fuel assemblies. Regulations must require detailed reporting that must also be available to the public.

Regulations do not address the significance of severe fouling of the nuclear fuel elements. Currently, Licensing Bases and Technical Specifications do not limit the amount of fouling of fuel elements. In some cases, the fouling is sufficient to induce significant oxidation of the fuel cladding, a situation that has led to "... a debate over (whether) the 17 percent includes the prior oxidation or it's just the oxidation during the ramp-up." (See ACRS Subcommittee transcript, May 31, 2002.) In another case, the axial offset anomalies that were traced to fouling of nuclear fuel elements, the situation was evaluated as follows, "They are a(n) annoyance. They affect economics, but they are not safety issues." (See ACRS Subcommittee transcript, April 24, 1998.) Severe fouling of nuclear fuel elements also leads to axial growth of the fuel rods beyond design limits as the operating temperatures of

the fuel rods become greater than allowed for in design. The fuel rods may expand sufficiently along their length to become restrained from further axial growth by the fuel assembly end fittings; the rods then bow and contact adjacent rods as well as control rod guide tubes.

While one nuclear power plant continued to operate at power, the need for repeated cleaning of an air cooling heat exchanger was not recognized as a key indicator of a substantial leak in the primary reactor system. As long as the plant operation remained within the technical specifications, there was no basis for the plant operators to perform prudent investigations. Clearly, regulations must address the need for investigating the grossly off-normal performance of this heat exchange equipment.

In several instances, the fouling of steam generator tubes has reduced the heat transfer effectiveness sufficiently to force operation at reduced secondary side pressures in order to maintain heat transfer rates. In the overall pattern, this likely will impact safety issues in addition to being an operating annoyance.

The fouling of main condenser heat transfer surfaces has led to a degradation of heat transfer effectiveness. Furthermore, on occasion these fouling deposits have been released into the coolant stream and then have contributed to fouling of fuel elements.

Shifting to the arena of test programs, during the past several decades the NRC and its defunct predecessors have funded well over one billion dollars of heat transfer test programs that have not included any allowance for the severe fouling of heat transfer surfaces that occurs during the operation of nuclear power plants. These test programs must be thoroughly studied and allowances must be made for a range of fouling of the heat transfer surfaces. Very likely, it will not be possible to produce reliable allowances for a range of degrees of fouling in which case, the results of the prior test programs such as FLECHT, LOFT, Semiscale and others must not be applied to the production of computer codes for reactor heat transfer analyses. Currently, the NRC is spending millions of dollars in heat transfer testing at facilities such as RBHT at Penn State, and these programs must be realigned to cover the cases of several degrees of fouling.

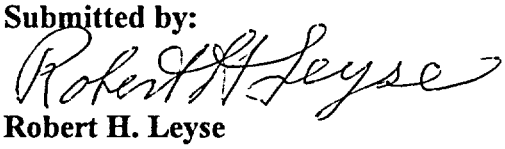
Shifting to the arena of computer codes, during the past several decades the NRC and its defunct predecessors have funded several hundred million dollars of code production related to heat transfer processes in nuclear power reactors. The codes thus produced, several versions of TRAC, RELAP and others, have included no provisions for a range of fouling conditions on the heat transfer surfaces. These codes must not be applied to the licensing of nuclear power plants until reliable allowances for a range of degrees of fouling are incorporated in the codes.

One measure of whether proper regulations are effected will be a determination that under the new regulations, conditions similar to those already reported in certain

Licensee Event Reports, will henceforth constitute license violations. Very likely there is a preponderance of documented nuclear power plant operating experience that is worthy of such review; as a possible example, one candidate may be Licensee Event Report 50-458/99-016-00.

The increased attention to detail in plant design, analysis and operations that will be effected via these needed regulations will enhance operating effectiveness, will discourage incomplete and misleading reporting to regulatory authorities and will reduce opportunities for sabotage by insiders. The increased detail of reporting to the public is required to fulfill many obligations including: (1.) The timely disclosure of significant information to professional risk analysts who advise large financial management organizations such as J. P. Morgan, Chase, H&Q. (2.) The timely disclosure of significant information to those individual investors who track available corporate performance data in making their investment decisions. (3.) The timely disclosure of significant information to state agencies that oversee the sale and/or acquisition of nuclear power plants by utility holding companies that operate within their jurisdiction.

Submitted by:



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